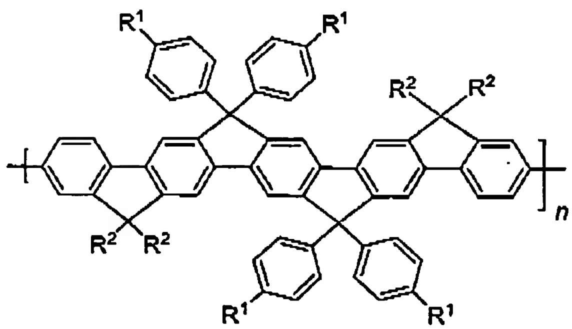
Amendments to the Specification and Abstract

(1) At page 1, line 32 to page 2, line 27, please amend the paragraph as follows:

The invention provides a polymer having the structure



wherein:

R^1 is the same or different at each occurrence and is selected from hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_1-C_{20} alkoxy, C_1-C_{20} oxyalkyl, C_2-C_{20} oxyalkenyl, C_2-C_{20} oxyalkynyl, C_1-C_{20} fluorinated alkyl, C_2-C_{20} fluorinated alkenyl, C_1-C_{20} fluorinated oxyalkyl, C_2-C_{20} fluorinated oxyalkenyl, C_2-C_{20} fluorinated oxyalkynyl, aryl, heteroalkyl, heteroalkenyl, heteroalkynyl, heteroaryl, -CN, -OR^3, -CO_2R^3, -SR^3, -$N(R^3)_2$, -$P(R^3)_2$, -SOR^3, -SO_2R^3, and -NO_2; ~~or adjacent R groups together can form a 5- or 6-membered cycloalkyl, aryl, or heteroaryl ring,~~

R^2 is the same or different at each occurrence and is selected from C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_1-C_{20} alkoxy, C_1-C_{20} oxyalkyl, C_2-C_{20} oxyalkenyl, C_2-C_{20} oxyalkynyl, C_1-C_{20} fluorinated alkyl, C_2-C_{20} fluorinated alkenyl, C_1-C_{20} fluorinated oxyalkyl, C_2-C_{20} fluorinated oxyalkenyl, C_2-C_{20} fluorinated oxyalkynyl, heteroalkyl, heteroalkenyl, heteroalkynyl, -CN, -OR^3, -CO_2R^3, -SR^3, -$N(R^3)_2$, -$P(R^3)_2$, -SOR^3, -SO_2R^3, and -NO_2; or adjacent ~~R~~$\underline{R^2}$ groups together can form a 5- or 6-membered cycloalkyl or heterocycloalkyl ring, and

R^3 is a substituent on a heteroatom which can be the same or different at each occurrence and is selected from hydrogen, alkyl, aryl, heteroalkyl and heteroaryl; and

n is greater than 2.

(2) At page 3, lines 17-19, amend the paragraph as follows:

As used herein, "oxyalkynyl" refers to alkynyl moieties in which at least one $-CH_2-$ unit of the ~~alkenyl~~alkynyl moiety has been replaced by an oxygen atom.

(3) At page 7, lines 23-36, amend the paragraph as follows:

Examples of materials which may facilitate hole-injection/transport comprise N,N'-diphenyl-N,N'-bis(3-methylphenyl)-[1,1'-biphenyl]-4,4'-diamine (TPD) and bis[4-(N,N-diethylamino)-2-methylphenyl](4-methylphenyl)methane (MPMP); hole-transport polymers such as polyvinylcarbazole (PVK), (phenylmethyl)polysilane, poly(3,4-ethylenedioxythiophene) (PEDOT), and polyaniline (PANI), or the like; electron and hole-transporting materials such as 4,4'-N,N'-dicarbazole biphenyl (BCP); or light-emitting materials with good hole-transport properties~~ such as chelated oxinoid compounds, including tris(8-hydroxyquinolato)aluminum (Alq3) or the like~~. In some embodiments, if the conductivity of the hole-injection/transport layer 120 can be made similar to anode layer 110, the anode layer 110 may not be required and the hole-injection/transport layer 120 can act as the anode for the electronic device.

(4) At page 8, lines 25-33, amend the paragraph as follows:

Examples of materials which may facilitate ~~hole~~electron-injection/transport comprise metal-chelated oxinoid compounds (e.g., Alq_3 or the like); phenanthroline-based compounds (e.g., 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline ("DDPA"), 4,7-diphenyl-1,10-phenanthroline ("DPA"), or the like); azole compounds (e.g., 2-(4-biphenylyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole ("PBD" or the like), 3-(4-biphenylyl)-4-phenyl-5-(4-t-butylphenyl)-1,2,4-triazole ("TAZ" or the like); other similar compounds; or any one or more combinations thereof. Alternatively, optional layer 140 may be inorganic and comprise BaO, LiF, Li_2O, or the like.

(5) At page 10, lines 1-12, amend the paragraph as follows:

Although not meant to limit, the different layers may have the following range of thicknesses: inorganic anode layer 110, usually no greater than approximately 500 nm, for example, approximately 10-200 nm; conductive polymer layer 120, usually no greater than approximately 250 nm, for example, approximately 20-200 nm; active layer 130, usually no greater than approximately 1000 nm, for example, approximately 10-80 nm; optional layer 140, usually no greater than approximately 100 nm, for example, approximately 20-80 nm; and cathode layer 150, usually no greater than approximately 1000 nm, for example, approximately 30-500 nm. If the anode layer 110 or the cathode layer 150 needs to transmit at least some light, the thickness of such layer may not exceed approximately 100 nm.

(6) At page 10, lines 32-38, amend the paragraph as follows:

As shown in the scheme below, Suzuki coupling of the fluorene-2-boronate ester 1, with the dibromoterephthalate 2 generated an intermediate, the pentaphenylenediester 3 in 92 % yield. Addition of an excess of 4-alkylphenyl lithium produced a diol which was facilely ring-closed using BF_3 etherate to generate the ladder-type pentaphenylene 4 (95 %). Bromination of 4 using $CuBr_2$ on alumina[[[23]]] gave the monomer 5 (91 %).

(7) At page 12, lines 5-22, amend the paragraph as follows:

a) A solution of 4-octylbromobenzene (3.05 mL, 3.4 g, 12.6 mmol) in dry THF (40 mL) in a 250 mL schlenk flask, was cooled to -78 °C in an acetone/dry ice bath. n-Butyllithium in hexane (8.0 mL, 1.6 M, 12.8 mmol) was then added and stirred for 20 minutes. Then a solution of the diester [[5]]3 (2.05 g, 2.1 mmol) in dry THF (40 mL) was added dropwise with stirring and the solution was slowly allowed to warm to room temperature. The mixture was stirred overnight and then the quenched with brine. The mixture was extracted with diethyl ether, and the extract was washed with salt and dried over $MgSO_4$. The crude product was chromatographed on silica using 0-5 % ethylacetate in hexane as eluent to give the diol as a thick viscous oil. (3.39 g, 96 %). ^{1}H NMR: δ 7.61 (m, 2H) 7.45 (d, 2H, J = 7.6Hz) 7.29 (m, 6H) 7.12 (m, 16H) 6.76 (m, 4H) 6.69 (s, 2H) 3.11 (s, 2H) 2.61 (t, 8H, J = 7.6Hz) 1.77-0.45 (m, 128H) ppm. ^{13}C NMR: δ 151.63, 151.23, 146.41, 144.19, 142.74, 141.71, 141.21, 141.05, 139.29, 136.29, 129.29, 128.76,

128.58, 127.93, 127.48, 124.32, 123.63, 120.35, 120.22, 83.91, 55.75, 40.55, 36.30, 32.72, 32.60, 32.45, 30.73, 30.30, 30.12, 30.09, 30.07, 30.04, 24.56, 23.46, 23.39, 14.65, 14.61 ppm. FDMS: m/z 1668.3.

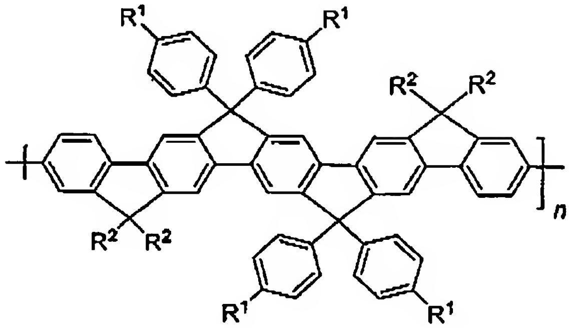
(8) At page 16, lines 10-34, amend the two paragraphs as follows:

The boronate ester **8** (2.45 g, 4.16 mmol), the diester [[9]]2 (697 mg, 1.98 mmol), and K_2CO_3 (821 mg) were dissolved in a mixture of THF (20 mL) and H_2O (10 mL) in a schlenk flask and the mixture was purged with argon for 20 minutes. To this tetrakis(triphenylphosphine)palladium (114 mg, 0.05 equiv) was added and the mixture was heated at 85 °C for 20 h. The cooled mixture was extracted with diethyl ether, and the extract was washed with brine and dried over $MgSO_4$. The residue was chromatographed on silica using 0-3 % ethylacetate in hexane to give the crude disilylpentaphenylene (1.89 g, 86 %).

In a schlenk flask, the ~~diester 2~~reaction product (1.89 g, 1.69 mmol) was added to dry THF (34 mL) along with anhydrous sodium acetate (278 mg, 2 equiv) and cooled to 0 °C. Bromine (0.37 mL, 1.15 g, 4.2 equiv) was added and the mixture was stirred for 20 minutes. The reaction was quenched by addition of triethylamine (1.89 mL, 8 equiv) followed by an excess of aqueous Na_2SO_3. The product was extracted into diethyl ether, and the extract was washed with sodium sulfite solution and dried over $MgSO_4$. The residue was recrystallized from hot hexane to give the dibromide 9 as shiny colourless crystals (1.37 g, 72 %). ^{1}H NMR (CD_2Cl_2): δ 7.87 (s, 2H) 7.77 (d, 2H, J = 7.9Hz) 7.64 (d, 2H, J = 7.9Hz) 7.53-7.31 (m, 8H) 3.64 (s, 6H) 1.99 (t, 8H, J = 8.8Hz) 1.27-0.62 (m, 60H) ppm. ^{13}C NMR: δ 169.06, 154.06, 151.27, 141.89, 140.58, 140.49, 140.05, 134.32, 132.51, 130.76, 128.06, 127.04, 123.87, 122.01, 121.96, 120.46, 56.36, 52.82, 41.08, 32.54, 30.74, 30.03, 29.99, 24.52, 23.36, 14.59 ppm. FDMS m/z 1129.30 Elemental Analysis: Calculated C 72.33 H 7.85 %; Found C 72.75 H 7.91 %.

(9) Amend the Abstract as follows:

~~The invention provides n~~Novel pentaphenylenes having the following general formula are described:



<ins>These</ins> polymers ~~which~~ generally exhibit blue electroluminescence[[.]] ~~The polymers~~ <ins>and</ins> are useful in electronic devices. ~~The invention further provides a~~<ins>A</ins> novel diketone compound having a low LUMO level <ins>of the following general structure is also described:</ins>